

Application No. 10/018,662

## REMARKS

By this amendment, claims 1-17 are canceled, claims 18-34 are added, and the specification and abstract have been amended. Presently, claims 18-34 are before the Examiner for consideration on their merits.

The amendments to the specification are made to bring errors in the published application to the attention of the Office and to place the application in better form for examination. Claims 1-17 are rewritten as new claims 18-34. These claims have also been revised in light of the Examiner's objection made in conjunction with the rejection under 35 U.S.C. § 112, second paragraph. Applicant also contends that the term "multivariable optimization" is not indefinite. This term is described on page 6, lines 26-30, of the specification. Reading this description with the knowledge of one of skill in the art would lead to a clear understanding of this term as used in claim 34. It is also argued that use of the term "its" in claims 26 and 33 is not indefinite. The encapsulation and rear contact both refer to the device itself and "its" makes this abundantly clear and not vague and indefinite. It is respectfully requested submitted that claims 18-34 are within the purview of 35 U.S.C. § 112, second paragraph and the rejection should be withdrawn.

Turning to the prior art rejection, the Examiner rejects claims 1, 2, and 5-17 based on United States Patent No. 5,928,437 to Dillard under 35 U.S.C. § 102(b)/35 U.S.C. § 103(a). In making this rejection, the Examiner alleges that Dillard teaches all of the features of the claims, and thus is anticipatory.

All claims are also rejected under 35 U.S.C. § 103(a) based on the combination of JP 9-232609 (Japan) and United States Patent No. 5,652,436 to Stone. The Examiner asserts that Japan teaches the invention except for the particular manner of separating the solar cells. Stone is cited to support the contention that it would be obvious to separate the cells of Japan using the techniques of Stone.

Finally, all claims are rejected under 35 U.S.C. § 103(a) based on the combination of Dillard and United States Patent No. 5,123,968 to Fraas et al. (Fraas). The Examiner admits that Dillard does not teach the optical concentrator. In response to this deficiency, the Examiner cites Fraas to allege that it would be obvious to use an optical concentrator in Dillard.

The rejection of claim 1, as amended, under 35 U.S.C. § 102(b)/35 U.S.C. § 103(a) based on Dillard should be withdrawn. Claim 18 now defines the invention in terms of that originally claimed and now including a high luminous power density of greater than 1 W/cm<sup>2</sup> and that the

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photolithography is used to define numerous photovoltaic converters on the same wafer and the shape of the frontal grid on each of the converters.

First, Dillard is unrelated to the invention in that it is directed to space applications, whereas the instant invention is intended for terrestrial use. The small size of Dillard is designed to address the peculiar problems faced in these space applications. In contrast, other considerations as are discussed in the specification drive the size of the claimed device. That is, the objective of the present invention is to reduce the cost of photovoltaic energy. To achieve this, III-V semiconductors operating at high concentrations are used (this aspect is fundamental to reducing costs and not recognized in Dillard). As a consequence of operating at high luminous concentrations the size of the photovoltaic converter has to be roughly in the order of a square millimeter (a characteristic which is not cited in any of the patents either). Thanks to the fact that the photovoltaic converters are so small, optoelectronic techniques can be used in their manufacture. One of the main techniques in optoelectronics is photolithography, which in our case is used to define the front metal grid, as well as defining the different converters on the same wafer. The photolithography used to this end has not been used up until now in the industrial production of any kind of concentrator solar cell, and, of course, is not described in Dillard. Dillard also does not address the range of size claimed, nor the high intensity limitation now found in the claims.

For all of the above reasons, Dillard cannot anticipate claim 18, and the rejection as applied to this claim must be withdrawn.

The rejection of the claims based on the combination of Japan and Stoner is also flawed. Japan describes a way to eliminate crystallographic growth defects in III-V semiconductor materials so as not to affect the operation of the solar cell. Japan bears no relationship whatsoever to the instant invention, which is independent of the way crystallographic growth is carried out. Therefore, this rejection is flawed, even if Stoner would be combined with Japan.

Applicant also traverses the rejection on the grounds that there is no reason to combine the references. Japan is directed to a solar battery. Stone teaches a diamond based structure, and a better way of separating the structures so as to avoid cutting through the diamond material. Stoner is totally unrelated to Japan, and there is no reason one of skill in the art would be driven to separate the device of Japan using the teachings of Stoner. There is no objective basis in fact for such a change, and a rejection of claim 18 would be flawed for this reason alone.

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The rejection based on the combination of Dillard and Fraas is improper since it lacks the requisite motivation for the combination. Dillard is clearly directed to space satellite applications and the manufacture of an irregularly shaped and non-planar microarray. In contrast, Fraas is directed to a photovoltaic array that involves rows and columns of tandem or stacked solar cells. In the Office Action, the Examiner concludes that it would be obvious to use the concentrator 12 of Fraas in the satellite application of Dillard so as to improve the conversion efficiency of the Dillard cell. This reasoning assumes that conversion efficiency is needed in Dillard; but there is no express mention of this in Dillard. It also ignores the fact that Dillard's application seeks to use minimal mass for capturing solar energy, and the microarray is designed to utilize wasted spaces because of its non-planar and irregular shape. Further, it fails to consider that other factors in space applications, e.g., heat dissipation and sun tracking, would lead one away from using the concentrator of Fraas in Dillard. Given the intent of Dillard and the other factors important in space applications, one of skill in the art would not be motivated to modify Dillard with the concentrator of Fraas. There is no basis to draw the conclusion of obviousness except for the use of hindsight on the part of the Examiner. Therefore, the rejection based on Dillard and Fraas is improper.

Furthermore, Fraas does not supply the deficiencies in Dillard as noted above, and even if it were combined with Dillard, the invention of claim 18 would not be taught.

Lastly, Applicant will address the alleged double patenting issue upon the indication of allowable subject matter.

In summary, it is respectfully submitted that the applied prior art does not establish a *prima facie* case of anticipation or obviousness against claims 18-34, and these claims are now in condition for allowance.

Accordingly, the Examiner is respectfully requested to examine this application in light of this amendment and pass claims 18-34 onto issuance.

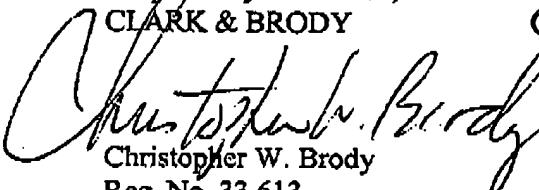
The above constitutes a complete response to all issues raised in the outstanding Office Action of March 24, 2003.

A petition for a one month extension of time under 37 CFR § 1.136(a) is hereby made. Please charge the petition fee of \$55.00 to Deposit Account No. 50-1088.

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Please charge any shortage in fees due in connection with the filing of this paper, including extension of times fees to deposit account number 50-1088 and please credit any excess fees to such account.

Respectfully Submitted,  
CLARK & BRODY

  
Christopher W. Brody  
Reg. No. 33,613

Suite 600  
1750 K Street NW  
Washington, DC 20006  
202-835-1111  
202-835-1755 (fax)

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